



A STUDY OF CORRELATION BETWEEN SENSORINEURAL HEARING LOSS AND DURATION OF CHRONIC OTITIS MEDIA

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ABSTRACT The diagnosis of chronic otitis media (COM) implies a permanent abnormality of the pars tensa or flaccida, most likely a result of earlier acute otitis media, negative middle ear pressure or otitis media with effusion. It results in some degree of conductive hearing loss because of perforated tympanic membrane with or without ossicular destruction. However, recurrent ear infections due to perforated tympanic membrane may result in absorption of toxins and macromolecules in the cochlea leading to sensorineural hearing loss (SNHL). This study was done to evaluate the correlation between the SNHL and duration of COM. Average threshold of speech frequencies was calculated using pure tone audiogram. The sensorineural hearing loss was found to be increased with increasing duration of the disease. Counselling of patients with regards to the risk of SNHL is needed.

KEYWORDS : Sensorineural hearing loss, Chronic otitis media

INTRODUCTION

Chronic otitis media is an inflammation of part or all of the mucoperiosteal lining of middle ear cleft. The disease has 2 types: Mucosal and Squamous (Cholesteatoma). All perforations of pars tensa are central indicative of tubotympanic disease. Chronic otitis media (COM) causes acquired hearing loss. The hearing loss is attributed to tympanic membrane perforation and ossicular chain changes resulting in conductive hearing loss.¹ Recently many studies have reported sensorineural hearing loss in COM showing impaired cochlear function. So, this study was taken up to evaluate the correlation between sensorineural hearing loss and duration of COM.²

Materials and Methods

Prospective observational study was done on 100 patients, with unilateral mucosal type COM, who attended ENT OPD in KIMS Hospital, Bangalore and between June 2017 to December 2017. Patients aged between 10-55 years, of both the sexes with history of unilateral ear discharge, for at least 3 months and who gave informed consent for the study were included in the study.³ Only patients with normal hearing on contralateral ear were included in the study. Patients having history of head trauma, prior ear surgery, familial history of hearing loss, previous exposure to ototoxic drugs, chronic exposure to loud noise or uncontrolled systemic conditions (diabetes mellitus, hypertension, hypothyroidism, dyslipidemia etc.) were excluded.^{3,4} Detailed history was taken and duration of the disease noted. Pure tone audiometry was done and values of hearing loss were recorded.

RESULTS

In this study, 72 patients had purely conductive hearing loss while 28 patients had mixed hearing loss. Out of 28 patients, 3 patients had disease duration of 4-6 years and 25 patients had the disease for more than 6 years.

As the duration of the disease increased, the degree of hearing loss also increased. Patients with 4- 6 years of disease duration had maximum 55 dB mixed hearing loss, while the patients with more than 6 years of COM had maximum 63dB mixed hearing loss (MHL).

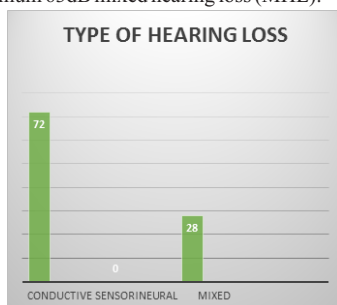


Figure 1. Types of Hearing Loss

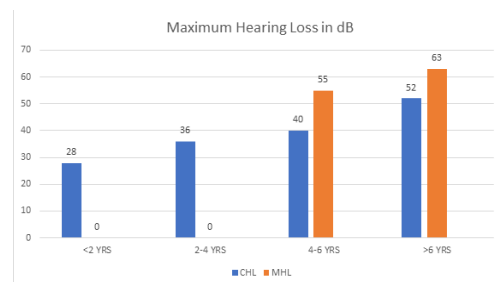


Figure 2. Maximum hearing loss in dB and duration of COM in years (CHL: Conductive hearing loss, MHL: Mixed hearing loss)

DISCUSSION

COM is the major cause of conductive hearing loss. There are different ideas and opinions regarding the incidence of SNHL in COM. The correlation between SNHL and COM has been shown in literature.⁵

Regarding the duration of disease, it was found that the incidence of SNHL in study ears with safe COM was highest in patients with longer duration of disease (30.3% in patients with disease duration more than 10 years) as compared to shorter duration.⁶

Kamaljit Kaur et al (2001) observed that as the duration of COM increased, the incidence of SNHL also increased. In their study 24% cases of COM were having SNHL.³ In a study by Dr. Beni Prasad and Dr. Rajshree Gupta (2018), there was a significant increase in the incidence of SNHL with increase in duration of ear discharge. 75% of patients with ear discharge for more than 10 years developed SNHL.⁷ In a study by Gulati et al, all patients with duration of disease for 16-20 years had SNHL.⁸

Azevedo AF et al found that development of SNHL in COM could be correlated to longer duration of ear disease. SNHL occurred in 13% patients of COM.⁹ Study by Sharma Karan, Gulati SK and Kaur Rupinder (2005) showed that as the duration of disease increased there was increase in incidence & severity of SNHL.¹⁰

The degree of hearing loss is determined by the size & site of tympanic membrane perforation, ossicle damage, presence of granulation tissue or cholesteatoma.¹¹

In a study done by Deviana and Indrasworo D (2016), out of 188 ear with COM tubotympanic type, 115 ears (61.17%) had CHL, 54 ears (28.72%) had mixed hearing loss, 11 ears (5.85%) had SNHL and 8 ears (4.26%) had normal hearing threshold.¹² A study by Razzoqi A N, Yasin Salim A H and Khefi Raed AS (2012) showed that the increase in hearing loss with increasing duration of pathology was statistically significant.¹³ Cusimano F, Cocita VC, D'Amico A (1989) reported an

increased mean bone conduction difference of 5.5 dB for every ten years duration of chronic otitis media.¹⁴ According to a study by Kholmatov in 2001, a progressively increased incidence of SNHL was seen as the duration of disease increased.² Similarly, in our studies we found much higher incidence of SNHL when the duration of disease was more.

According to a study by Paparella et al, COM can lead to SNHL by passage of inflammatory agents through round window, as the anatomical position and characteristic of round window encourages this passage.² He also showed that chronic otorrhea has deleterious effects on inner ear. He studied the role of round window in transmitting inflammation from middle ear to the labyrinth and showed effects on speech frequency in bone conduction thresholds in COM.¹⁵ Similar results were obtained by MacAndie who showed more higher frequency loss than at lower frequencies.¹⁶

The chronic inflammatory process can produce some circulatory disturbance such as vasodilatation and vasoconstriction of the mucosal vessels of the round window membrane which could influence the inner ear.¹⁴ The hair cells at the base of cochlea are responsible for higher frequency hearing. They are located closer to the round window and are likely to be affected more, because more toxins will reach these hair cells in larger concentration.

In a study done by Levine et al, they stated that there is a small but statistically significant relation between SNHL and age of the patients suffering from COM.¹⁷ According to him, with the increasing age, percentage of patients suffering from SNHL also increased. Rice found sensorineural hearing loss of 20 dB or more in 34% of 225 consecutive ears undergoing tympanoplasty for various reasons.² Verhoeven (1961) and Thorburn (1965) observed the cochlear losses resulting from COM.²

Incidence of SNHL is maximum in the active stage of the disease as compared to the inactive stage and quiescent stage of the disease. Presence of active discharge in middle ear will cause more damage to inner ear as compared to absence of discharge as fewer toxins will enter the inner ear through round window. Passage of toxins through round window can result in damage to the hair cells.^{18,19}

CONCLUSION

In this study, SNHL was found to be involving the higher frequencies. Moreover, the incidence of SNHL progressively increased with the increase in duration of CSOM.

On the basis of the results obtained, we observed a consistent correlation between severity of SNHL and the duration of the COM. These findings suggest that more severe middle ear disease may result in SNHL and thus early intervention may help to stop the further hearing loss.

So, we conclude that there is an association between COM and SNHL. There is scope for further studies also involving the site and size of tympanic membrane perforation.

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